

Development and Results of a Motivational Interviewing Program for Health Education to Facilitate Osteoporosis Self-Management

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Abstract

Introduction: Medication adherence is poor for many chronic conditions, including osteoporosis. Few proven interventions exist to improve Osteoporosis (OP) medication adherence. We report on methods to develop a telephonic motivational interviewing-based counseling program for health educators to promote osteoporosis medication adherence in elderly.

Methods: Five health educators participated in an initial day and a half education training session. Motivational Interviewing techniques were reinforced by a behavioral scientist via semi-monthly calls over one year. At trial midpoint, two 20-30 minute client conversations were recorded. A certified Motivational Interview trainer evaluated performance using the Motivational Interviewing Treatment Integrity code (MITI) and provided feedback (scale: 0=poor to 5=excellent) to determine the extent of motivational interviewing "spirit" incorporated by the health educators during interactions with clients.

Results: All health educators were female, mean age of 42 years. The range of health counseling experience was 7 to 15 years in varied healthcare areas. Scores across the five MITI domains suggest performance was strongest in providing direction and empathy. Domains needing improvement included evocation, collaboration, and autonomy/support. On average, the total reflection to question ratio was 1.3, suggesting the need for more client reflections.

Conclusion: Among health educators without substantial prior motivational interviewing experience, a year-long, multi-faceted motivational interviewing training program resulted in suboptimal competence in use of motivational interviewing counseling behaviors. This program serves as a novel, instructive model to inform the development and maintenance of MI intervention integrity among health educators using telephonic counseling.

Keywords: Osteoporosis; Medication adherence; Motivational interviewing

Introduction

Patients with osteoporosis can avail themselves of a variety of medications to maximize bone health and reduce fracture risk [1]. However, long-term medication non-adherence is prevalent [2]. One year after the initiation of an osteoporosis medication only 50% of patients continue to use their medication, and beyond one year 75% have become non-adherent [3,4]. A prospective study demonstrates adherence rates of 89% at 6 months and 82% at 18 months among 116 adults (102 postmenopausal women) with vertebral fractures on teriparatide therapy [5]. While this study demonstrated excellent adherence rates, fractures had already occurred and were likely a motivating factor for adherence. Among adults who have not sustained fractures, poor adherence to osteoporosis medications, increased risk of fracture and significantly lower gains in bone mineral density during treatment represent a clear potential for deleterious health outcomes in these patients [6-9].

Patients report a variety of reasons for non-adherence with osteoporosis medications, including real or perceived medication side effects, treatment costs, depression, forgetfulness, and a lack of understanding regarding the chronic nature of osteoporosis [10,11]. A variety of interventions attempt to improve osteoporosis medication adherence and typically involve patient-directed counseling approaches, however, there has been a relative lack of attention to the frequency of counseling, the behavioral models underlying the counseling programs, and the counselors' training [12-16].

Several successful adherence trials in other medical areas have

based interventions on behavioral theories [17-20]. Motivational Interviewing (MI), one such counseling approach, was developed by Miller and Rollnick and is built upon Prochaska's Transtheoretical Model of behavior change [21,22]. The Transtheoretical Model of behavioral change posits that individuals move through a series of stages while changing behavior. Thus, behavioral interventions, developed and targeted to an individual's readiness for change are more successful at promoting behavior change [22]. As opposed to traditional counseling approaches which are directed towards providing advice and which have poor success rates (5-10%), MI incorporates an active listening strategy of counseling and emphasizes relationship building with patients to facilitate their evaluation of personal health risks and treatments to help patients develop self-management strategies [23,24].

MI has been widely used for a variety of health conditions including

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substance abuse programs, interventions targeting anti-retroviral therapy for HIV, treatments for hypertension, and weight control for women with Type 2 diabetes [25,26]. In meta-analyses of controlled clinical trials, MI interventions generate large effects in improving medication adherence, and promising results similar to those noted in treatment of substance abuse [27-30]. MI emphasizes collaboration between the patient and health care provider, improving providers' attention to patients' attitudes and beliefs, and simultaneously mobilizing patients to further explore and overcome ambivalence towards specific treatment strategies [28,31]. In a review of Motivational Interviewing for health care settings, Britt et al. acknowledge it is unclear which forms of MI benefit which patients and how much training is needed when used in clinical settings [31,32].

This methodology paper reports on the development of a MI training program and its implementation within a large pragmatic randomized controlled trial to address patient adherence to osteoporosis medications using telephonic counseling [33,34]. While the primary trial did not demonstrate a statistically significant increase in adherence, a 7% improvement was observed in the group receiving MI counseling [34]. The purpose of this paper is to highlight challenges and strategies that may inform future application of MI in large-scale clinical settings and telephonic counseling programs for homebound patients.

Methods

This descriptive report characterizes procedures used to develop, cultivate, and maintain MI skills among a group of five health educators over a one-year period. Health educators used MI to discuss and promote adherence among older adults enrolled in a large randomized blinded controlled clinical trial, recruited from Pennsylvania's Pharmaceutical Assistance Contract for the Elderly (PACE), managed by the Pennsylvania Department of Aging. Subjects in the trial's intervention arm received educational mailings on osteoporosis and fracture prevention along with telephone counseling; subjects in the control arm received the educational mailings only. The protocol was reviewed by the Institutional Human Subjects Review Board and deemed exempt prior to the implementation of the study. Further details of the clinical trial design are reported in *Osteoporosis International* and *Archives of Internal Medicine* [33,34].

Five health educators were recruited from CHES, the Certified Health Educators Society via advertisement. Two of the five educators (mean age of 42 years) were certified Health Educators and the others

were health professionals (nurse, dietician, and social worker) with experience with patient counseling. At baseline, only one of the five health educators had any experience using MI (Table 1).

Motivational Interviewing Training

Consistent with adult learning and educational principles, the five health educators received education and reinforcement in MI. Prior to the trial start, the health educators attended a day and a half intensive educational seminar led by the research team and the MI instructor. The MI instructor had over nineteen years of experience in counseling and fifteen years of experience in MI training. She was also a member of the Motivational Interviewing Network of Training (MINT). The seminar consisted of didactic and experiential learning activities. The first session led by the inter professional team (rheumatologist and behavioral scientist) covered general information about osteoporosis, the epidemiology of osteoporosis, medical and non-pharmacologic management, and interventions to prevent falls or related injuries. The second day led by the certified MI instructor, focused on MI principles and included information and skill-based learning activities relevant to MI. The health educators engaged in role play activities, practiced problem-solving skills to address non-adherence issues, and participated in 360° evaluations of their performance using MI techniques [35]. A sample of the MI techniques used in role play calls and later in the reinforcement sessions are found in Table 2.

Following the initial training, the health educators, behavioral scientist, primary investigator (a rheumatologist), and study coordinator participated in frequent calls to discuss issues arising with clients (questions about medications, and new information in the media about medication side effects) and strategies to promote use of MI in weekly calls with clients. Health educator training calls (initially weekly then bimonthly) continued for the first fourteen months of the trial, and then transitioned to once every two to four weeks.

In addition to regular contact with and support from the study team, health educators received one-on-one coaching and periodic group discussion with the certified MI instructor every six months. This individual served as an expert in quality assurance planning and evidence-based counseling practice. One-on-one MI coaching included a review and assessment of audiotaped telephone calls between the patient and health educator. The health educators purposefully selected two clients; one with whom they believed they had good rapport and one with whom they felt they needed guidance. With the clients consent, calls were recorded and the audiotapes shared with

Health Educator	Years Experience	Age (yrs)	Gender	Certifications	Clinical Experience	Past Experience with MI
HE 1	9 yrs	35	Female	CHES	Hospital (education focused); program manager for cancer control programs (screening/education/outreach)	No formal training in MI, familiar with concepts.
HE 2	7 yrs	59	Female	CHES; Cert. Master Trainer: chronic disease self-manage	Occupational medical consulting	Previous training in MI, familiar with practice in clinical nursing.
HE 3	10 – 15 yrs	46	Female	LICSW; Diplomate American Psychotherapy Assn; Cert. NLP (neurolinguistic program/hypnosis)	Melanoma prevention program (phone based); New Mom's project (phone based counseling); DFCI SunWise (phone-based education with school nurses)	No formal training in MI, familiar with concepts.
HE 4	15 yrs	37	Female	NC Registered HE (R.H.Ed.); cert. in HIV/AIDS pre/post testing counsel and referral (by NCHHS)	Adolescent health coordinator, Community Health Center	Previous knowledge of MI, no formal training.
HE 5	10 yrs	32	Female	Registered Dietitian; Cert. Diabetes Educator; Cert. Dietitian-Nutritionist	Inpatient, outpatient, public health nutrition	No formal training in MI, familiar with concepts.

HE stands for Health Educator LICSW= licensed social worker, MI= motivational interviewing

Table 1: Baseline Characteristics of Health Educators.

Global Domains	Goal	Examples
Evocation	Counselor emphasizes the clients' role in identifying and expressing his/her ideas about behavioral change motivation. Goal to evoke opinions, ideas, reasons and motivation for change.	Convert closed questions to open questions. Look for ambivalence – I need to take my medicine but I worry about the side effects. Ask for elaboration, affirm, reflect, summarize. "You seem to be really committed to taking your medication. Tell me a bit about how you plan to take your OP meds"
Collaboration	Focus is on eliciting clients' viewpoints and preferences to develop a collaborative plan of care. GOAL: Conveys respect for clients' ideas, opinions and autonomy. Be supportive and exploratory.	Please share with me your experiences with taking your medications..... what has valued well for you?
Autonomy/Support	Autonomy refers to clients' ability to make their own choices and in some instances to decide not to change their behavior.	"I understand you find it difficult to take your OP medication daily.... "
Direction	Stay on task while discussing the target behavior or connect past information shared by the client into the current discussion.	"You mentioned that you are more likely to remember taking your medications if you place them on the kitchen table in the morning. Would you consider doing that regularly for your OP medication?"
Empathy	The ability to engage with the client and understand the client's perspective.	"I understand it is very difficult to remember to take your OP medications each morning. Will you share with me the factors that influence your ability to take the medication? "
MI Strategies		
Build rapport Goal Directive Elicit Change Talk Summarize Affirm Resolve ambivalence Simple Reflections Complex Reflections Decisional Balance		

LICSW= licensed social worker, MI= motivational interviewing

Table 2: Examples of Motivational Interviewing Domains and Strategies.

Global Domains		HE1	HE2	HE3	HE4	HE5
Evocation	Tape 1	3	4	3	3	3
	Tape 2	2	4	3	2	2
	Average	2.5	4	3	2.5	2.5
Collaboration	Tape 1	2.5	3	3	3	3
	Tape 2	2	3	3	2	2
	Average	2.25	3	4	2.5	2.5
Autonomy/Support	Tape 1	3	3	3	4	3
	Tape 2	3	3	4	4	2
	Average	3	3	3.5	4	2.5
Direction	Tape 1	5	5	5	4	5
	Tape 2	5	5	5	4	5
	Average	5	5	5	4	5
Empathy	Tape 1	3	4	5	4	4
	Tape 2	4	4	4	3	3
	Average	3.5	4	4.5	3.5	3.5
Global Spirit Score	Tape 1	2.8	3.3	3.0	3.3	3.0
	Tape 2	2.5	3.3	3.3	2.6	2.0
	Average	2.65	3.3	3.15	2.95	2.5

LICSW= licensed social worker, MI= motivational interviewing

Table 3: MITI Performance Scores for Health Educators during Audiotaped Conversations As Determined by the MI Expert.

the MI instructor. The MI instructor provided a formal evaluation of the health educators' counseling using the Motivational Interviewing Technique Integrity code (MITI 3.0), a clinical measure used to assess the application of MI to provide qualitative feedback and enhance performance [36,37]. The MITI is a tool in development, designed specifically to assess interviewers' application of MI in clinical trials and to provide structured feedback to clinicians regarding the use of MI. It does not provide information on patient behaviors. The MITI consists of two main elements: behavioral counts and global scores. Behavior counts are essentially a summary of the instances of specific interviewer behaviors during the conversation (eg use of reflective statements

versus total questions posed). The counts are not evaluative in the sense that a judgment about the behavior is not provided. Counts are used as a measure of the practitioner's use of core MI skills. The two global scores, empathy and MI spirit, provide an evaluation of the overall use or MI gestalt and are assessed on a seven-point scale. Global empathy reflects how interested the interviewer is listening to the patient and attempting to understand the meaning of the patient's words. The MITI spirit score provides an evaluation of the interviewer's overall ability to use MI, specifically focusing on uses of evocation, collaboration and autonomy. The MI evocation strategy focuses on encouraging the patient to share his/her ideas and discourages implementers from providing information or giving opinions (Table 2). Specific role playing activities were also included in the reinforcement sessions. Lastly, as a concluding support and training component, educators completed a short self-assessment, used to guide the MI instructor in tailoring a final professional coaching session to the specific needs and impressions of each health educator.

Data collection/analysis

To better understand the effect of this continuous training program, we evaluated the educators' performance with MI using a variety of techniques. At two different time points, the MI instructor completed evaluations after coaching sessions. The health educators provided self-assessments using a 7-point Likert scale ranging from 1, never used this strategy to 7, use of strategy almost the entire session. The MI instructor used a 5-pt Likert scale ranging from 0 (poor) to 5 (excellent). The MI expert also provided specific commentary for each score that was recorded and shared with the health educators following the calls. Evaluations offer benchmarks for progress and potential changes in MI practice with continued reinforcement of skills and techniques.

Results

This section provides a summary of MI instructor's assessment of MI use among the health educators and a summary of the health educators' self-assessments (Tables 3 and 4). Among this group of

	HE1	HE2	HE3	HE4	HE5
MI Spirit	5	7	7	7	5
Open-Ended Questions	4	7	5	6	6
Affirmation of Strengths/Change Efforts	5	7	6	7	7
Reflective Statements	4	6	5	7	4
Fostering a Collaborative Atmosphere	5	6	4	6	6
Motivation to Change	3	6	4	5	4
Developing Discrepancies	3	5	3	4	3
Change Planning Discussion	3	4	4	4	6
Client-Centered Problem Discussion and Feedback	3	6	5	5	3
Unsolicited Advice, Direction-Giving, or Feedback	2	4	4	3	4
Direct Confrontation of Client	1	1	1	1	1
Asserting Authority	1-2	1	2	1	1
Close-Ended Questions	2	1	2	3	2

Scale: 1 = never used the strategy, 7 = use of strategy almost the entire session, LICSW= licensed social worker, MI= motivational interviewing

Table 4: Health Educators' Self-Assessment of Motivational Interviewing Skill Use.

experienced health educators and clinicians, the MI instructor's scores ranged from 2.5/5 to 4/5, with 60% of the HE scoring a 2.5. These data suggest the health educators' performance was low and needed further development. Perhaps MI is difficult to employ when health educators have experience or knowledge in a specific health domain. As such, there was a greater tendency to share information and provide solutions rather than emphasize the clients' role in identifying and expressing his/her ideas about behavioral change motivation.

Effective behavior change is established through collaboration. With MI, the focus of conversation is on eliciting clients' viewpoints and preferences to develop a collaborative plan of care. Authoritarian comments should be avoided. The evaluation data for health educator scores in this domain ranged from 2.25 to 4 out of 5 possible points. The MI instructor's qualitative assessment of the health educator with the lowest performance in this domain indicated the health educator missed opportunities to deepen the clients' contribution to the interview regarding their ideas about and motivation for change. For example, rather than promoting collaboration, the educator's input was heavily factual thereby, sacrificing opportunities for mutual problem solving in favor of supplying knowledge or expertise. Another health educator scored an average of 3 points for collaboration. This health educator incorporated clients' goals, ideas and values, but was lukewarm regarding the clients' concern about pain and medication side effects. While this health educator allowed the client to lead most of the conversation, she periodically expressed disagreement.

A third element of MI is autonomy/support. Autonomy refers to the clients' ability to make their own choices and requires the health educator/clinician to accept clients may not wish to change behavior. Eighty percent of the health educators averaged 3 or higher in autonomy over the one-year program. The MI instructor provided positive feedback to HE, noting their effective use of this strategy, when health educators actively affirmed a client's choice not to change their behavior regarding medications.

Providing direction is another key element in fostering behavior change. Four of the five health educators scored a 5 (excellent). Examples of excellent counseling behavior noted by the MI instructor were: (1) health educator stayed on task while discussing the target behavior or tied past information shared by the client into the current discussion. The health educator who scores a 4/5 provided structure in the discussion about the patient's target behavior but focused on previous issues related to a fall risk rather than encouraging discussion regarding

behavior change. Thus, by addressing past issues and not addressing the current health behavior, the educator did not communicate with the client about potential steps towards achieving the target behavior.

Sixty percent of the educators were scored 3.5 out of 5 by the MI instructor with respect to the use of empathy. Empathy refers to the educator's ability to engage with the client and understand the client's perspective. Situations where the health educators successfully employed this strategy were apparent when the health educator conveyed interest in their clients' situation, and encouraged their clients to elaborate on the factors that impacted their behavior.

The five health educators received highly variable scores on the use of MI and the data suggest their MI skills did not consistently improve over the trial (Table 3). In general, across all educators the strongest skill was providing direction and confronting the client. Four of the five educators successfully employed the use of empathy. However, based on the MI instructor's scores, there was less frequent use of evocation and collaboration during clinical discussions, suggesting areas for future improvement. The ratio of reflective statements to questions during clinical discussions revealed an average ratio of 1:3, suggesting the need for greater use of reflective statements to help patients formulate their thoughts around the health behaviors discussed.

Health educators' self-assessment scores indicated that most rated themselves as having high to excellent MI spirit (Table 4). All reported that they did not directly confront clients during discussions nor assert authority, (score of 1 for direction and 1 to 2 for authority). Sixty percent reported regular use of client feedback and client-centered problem-oriented discussion techniques (scores of 5 or 6 out of 7). The highest self-rated domains included affirmation of strengths and change efforts, fostering a collaborative atmosphere, and use of reflective statements (Table 4).

Discussion

The concept and adaptation of MI reflection strategies are difficult to master. While the interprofessional team provided health educators with routine feedback on MI, information and discussions also occurred regarding medication side effects and other health-related topics. The length of time between MI reinforcement by the certified MI instructor may have affected the health educators' ability to correctly implement difficult strategies and techniques. These findings are consistent with other studies of MI training among health care personnel [32,38-40]. Therefore, we believe shorter intervals between trainings would result

in better MI performance across domains. Additionally, the fact that educators were simultaneously learning about osteoporosis and how to comprehensibly and age-appropriately translate this information to their clients may have impacted their learning and integration of MI during the telephonic counseling sessions. Previous studies indicate that counselors tend to inflate their scores on MI performance compared to a third party assessment of performance [39,40]. Finally, inconsistency in MI scoring may be attributed to the educators' self-selection of clients and the MI trainers' choice of calls to review. As this was a subjective, non-random process carried out by the educators, there is a potential for selection bias. While recorded calls and corresponding coaching sessions were generally representative of the educators' rapport and skill with clients, educators often used sessions with the MI instructor to learn how to work with challenging clients. Therefore, the interactions reviewed by the instructor may have been more complex.

MI is a highly developed counseling skill set that requires skill-specific training and reinforcement. Application of MI in clinical trials requires frequent monitoring, exposure, individualized feedback, and practice to ensure competency. These data suggest a multi-modal approach to reinforcement of MI counseling through weekly, bi-weekly telephone calls and interval assessments and feedback from an experienced MI instructor led to suboptimal performance in overall MI use as evidenced by the low reflection to question asking ratios in the audiotaped sessions.

This 14-month training program in Motivational Interviewing led to increased awareness of MI techniques and inconsistent performance across MI domains. Providing feedback and reinforcement to clients, skills that are commonly used in other behavior change arenas were more likely to be used consistently, perhaps due to exposure from prior work interactions. Health educators' use of MI-specific strategies such as evocation, reflection and collaboration were deemed by the MI instructor to be fair, but requiring improvement. Whereas, the health educators' self-rating were higher across all MI domains. Over-estimating of MI expertise by the health educators may have led to less effective counseling or less actual use of MI strategies in the primary trial [35]. These data suggest the need for periodic reinforcement of MI skills and techniques when used in long-term trials.

Some limitations of the training program should be noted. The initial training session in MI may have been too short to serve as a platform for MI counseling development. We also used a small number of health educators who were unfamiliar with osteoporosis prior to the start of the training period. Thus, some of the weekly, biweekly and monthly calls were focused on osteoporosis medication side effects, health concerns related to osteoporosis pathology as well as MI counseling strategies. We did not conduct a reliability assessment of the MITI coding. However, this coding, developed by Moyer is considered the standard for assessment of MI counseling [37].

This program is novel in that it used extended training (weekly, biweekly and eventually monthly over the one year period) combined with periodic reinforcement by a certified MI instructor to promote a highly specialized skill set within health counseling to maintain the integrity of educator-client interactions. Health educators were offered multimodal training formats, allowing them to experience skill reinforcement in a variety of contexts. The study team was available to provide continued support when issues with MI techniques or application arose. A certified MI instructor was contracted to conduct group and individual coaching, serving as a considerable professional resource during the course of the trial. Lastly, self-evaluations offered

the educators ample opportunity to give and receive feedback about the experience and training.

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References

1. Cranney A, Guyatt G, Griffith L, Wells G, Tugwell P, et al. (2002) Meta-analyses of therapies for postmenopausal osteoporosis. IX: Summary of meta-analyses of therapies for postmenopausal osteoporosis. *Endocrine Reviews* 23: 570-578.
2. Kothawala P, Badamgarav E, Ryu S, Miller RM, Halbert RJ (2007) Systematic review and meta-analysis of real-world adherence to drug therapy for osteoporosis. *Mayo Clin Proc* 82: 1493-1501.
3. Solomon DH, Avorn J, Katz JN, Finkelstein JS, Arnold M, et al. (2005) Compliance with osteoporosis medications. *Arch Intern Med* 165: 2414-2419.
4. Curtis JR, Westfall AO, Cheng H, Lyles K, Saag KG, et al. (2008) Benefit of adherence with bisphosphonates depends on age and fracture type: results from an analysis of 101,038 new bisphosphonate users. *J Bone Miner Res* 23: 1435-1441.
5. Adachi JD, Hanley DA, Lorraine JK, Yu M (2007) Assessing compliance, acceptance, and tolerability of teriparatide in patients with osteoporosis who fractured while on antiresorptive treatment or were intolerant to previous antiresorptive treatment: an 18-month, multicenter, open-label, prospective study. *Clin Ther* 29: 2055-2067.
6. Lekkerkerker F, Kanis JA, Alsayed N, Bouvenot G, Bulet N, et al. (2007) Adherence to treatment of osteoporosis: a need for study. *Osteoporos Int* 18: 1311-1317.
7. Siris ES, Harris ST, Rosen CJ, Barr CE, Arvesen JN, et al. (2006) Adherence to bisphosphonate therapy and fracture rates in osteoporotic women: relationship to vertebral and nonvertebral fractures from 2 US claims databases. *Mayo Clinic Proceedings* 81: 1013-1022.
8. Rabenda V, Mertens R, Fabri V, Vanoverloop J, Sumkay F, et al. (2008) Adherence to bisphosphonates therapy and hip fracture risk in osteoporotic women. *Osteoporos Int* 19: 811-818.
9. Hilgsmann M, Rabenda V, Bruyère O, Reginster JY (2010) The clinical and economic burden of non-adherence with oral bisphosphonates in osteoporotic patients. *Health Policy* 96: 170-177.
10. McHorney CA, Schousboe JT, Cline RR, Weiss TW (2007) The impact of osteoporosis medication beliefs and side-effect experiences on non-adherence to oral bisphosphonates. *Curr Med Res Opin* 23: 3137-3152.
11. Cramer JA, Gold DT, Silverman SL, Lewiecki EM (2007) A systematic review of persistence and compliance with bisphosphonates for osteoporosis. *Osteoporos Int* 18: 1023-1031.
12. Clowes JA, Peel NF, Eastell R (2004) The impact of monitoring on adherence and persistence with antiresorptive treatment for postmenopausal osteoporosis: a randomized controlled trial. *J Clin Endocrinol Metab* 89: 1117-1123.
13. Cook PF, Emiliozzi S, McCabe MM (2007) Telephone counseling to improve osteoporosis treatment adherence: an effectiveness study in community practice settings. *Am J Med Qual* 22: 445-456.
14. Cooper A, Drake J, Brankin E; PERSIST Investigators (2006) Treatment persistence with once-monthly ibandronate and patient support vs. once-weekly alendronate: results from the PERSIST study. *Int J Clin Pract* 60: 896-905.
15. Delmas PD, Vrijens B, Eastell R, Roux C, Pols HA, et al. (2007) Effect of monitoring bone turnover markers on persistence with risedronate treatment of postmenopausal osteoporosis. *J Clin Endocrinol Metab* 92: 1296-1304.
16. Guilera M, Fuentes M, Grifols M, Ferrer J, Badia X; OPTIMA study investigators (2006) Does an educational leaflet improve self-reported adherence to therapy in osteoporosis? The OPTIMA study. *Osteoporos Int* 17: 664-671.
17. Cramer JA, Gold DT, Silverman SL, Lewiecki EM (2007) A systematic review of persistence and compliance with bisphosphonates for osteoporosis. *Osteoporos Int* 18: 1023-1031.

18. Arden NK, Earl S, Fisher DJ, Cooper C, Carruthers S, et al. (2006) Persistence with teriparatide in patients with osteoporosis: the UK experience. *Osteoporos Int* 17: 1626-1629.
19. Ziller V, Zimmermann SP, Kalder M, Ziller M, Seker-Pektas B, et al. (2010) Adherence and persistence in patients with severe osteoporosis treated with teriparatide. *Curr Med Res Opin* 26: 675-681.
20. Gold DT, Alexander IM, Ettinger MP (2006) How can osteoporosis patients benefit more from their therapy? Adherence issues with bisphosphonate therapy. *Ann Pharmacother* 40: 1143-1150.
21. Heather N, Rollnick S, Bell A, Richmond R (1996) Effects of brief counselling among male heavy drinkers identified on general hospital wards. *Drug Alcohol Rev* 15: 29-38.
22. Miller WR (1996) Motivational interviewing: research, practice, and puzzles. *Addict Behav* 21: 835-842.
23. Kottke TE, Battista RN, DeFries GH, Brekke ML (1988) Attributes of successful smoking cessation interventions in medical practice. A meta-analysis of 39 controlled trials. *JAMA* 259: 2883-2889.
24. Bien TH, Miller WR, Tonigan JS (1993) Brief interventions for alcohol problems: a review. *Addiction* 88: 315-335.
25. Reid SC, Teesson M, Sannibale C, Matsuda M, Haber PS (2005) The efficacy of compliance therapy in pharmacotherapy for alcohol dependence: a randomized controlled trial. *J Stud Alcohol* 66: 833-841.
26. Samet JH, Horton NJ, Meli S, Dukes K, Tripps T, et al. (2005) A randomized controlled trial to enhance antiretroviral therapy adherence in patients with a history of alcohol problems. *Antivir Ther* 10: 83-93.
27. Dilorio C, McCarty F, Resnicow K, McDonnell Holstad M, Soet J, et al. (2008) Using motivational interviewing to promote adherence to antiretroviral medications: a randomized controlled study. *AIDS Care* 20: 273-283.
28. Miller WR, Yahne CE, Moyers TB, Martinez J, Pirritano M (2004) A randomized trial of methods to help clinicians learn motivational interviewing. *J Consult Clin Psychol* 72: 1050-1062.
29. Ogedegbe G, Schoenthaler A, Richardson T, Lewis L, Belue R, Espinosa E, et al. (2007) An RCT of the effect of motivational interviewing on medication adherence in hypertensive African Americans: rationale and design. *Contemp Clin Trials*. 28: 169-181.
30. Smith DE, Heckemeyer CM, Kratt PP, Mason DA (1997) Motivational interviewing to improve adherence to a behavioral weight-control program for older obese women with NIDDM. A pilot study. *Diabetes Care* 20: 52-54.
31. Borrelli B, Riekert KA, Weinstein A, Rathier L (2007) Brief motivational interviewing as a clinical strategy to promote asthma medication adherence. *J Allergy Clin Immunol* 120: 1023-1030.
32. Britt E, Hudson SM, Blampied NM (2004) Motivational interviewing in health settings: a review. *Patient Educ Couns* 53: 147-155.
33. Martins RK, McNeil DW (2009) Review of Motivational Interviewing in promoting health behaviors. *Clin Psychol Rev* 29: 283-293.
34. Solomon DH, Gleeson T, Iversen M, Avorn J, Brookhart MA, et al. (2010) A blinded randomized controlled trial of motivational interviewing to improve adherence with osteoporosis medications: design of the OPTIMA trial. *Osteoporos Int* 21: 137-144.
35. Solomon DH, Iversen MD, Avorn J, Gleeson T, Brookhart MA, et al. (2012) Osteoporosis telephonic intervention to improve medication regimen adherence: a large, pragmatic, randomized controlled trial. *Arch Intern Med* 172: 477-483.
36. Moyers TB, Martin T, Catley D, Harris KJ, Ahluwalia JS (2003) Assessing the integrity of motivational interviewing interventions: Reliability of the Motivational Interviewing Skills Code. *Behavioural Cognitive Psychotherapy*, 31, 177-184.
37. Moyers TB, Martin T, Manuel JK (2012) The motivational interviewing treatment integrity (MITI) Code: Version 3.0. CASAA New Mexico.
38. Levensky ER, Forcehimes A, O'Donohue WT, Beitz K (2007) Motivational interviewing: an evidence-based approach to counseling helps patients follow treatment recommendations. *Am J Nurs* 107: 50-58.
39. Miller NH (2010) Motivational interviewing as a prelude to coaching in healthcare settings. *J Cardiovasc Nurs* 25: 247-251.
40. Bean MK, Biskobing D, Francis GL, Wickham E 3rd (2012) Motivational interviewing in health care: results of a brief training in endocrinology. *J Grad Med Educ* 4: 357-361.

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